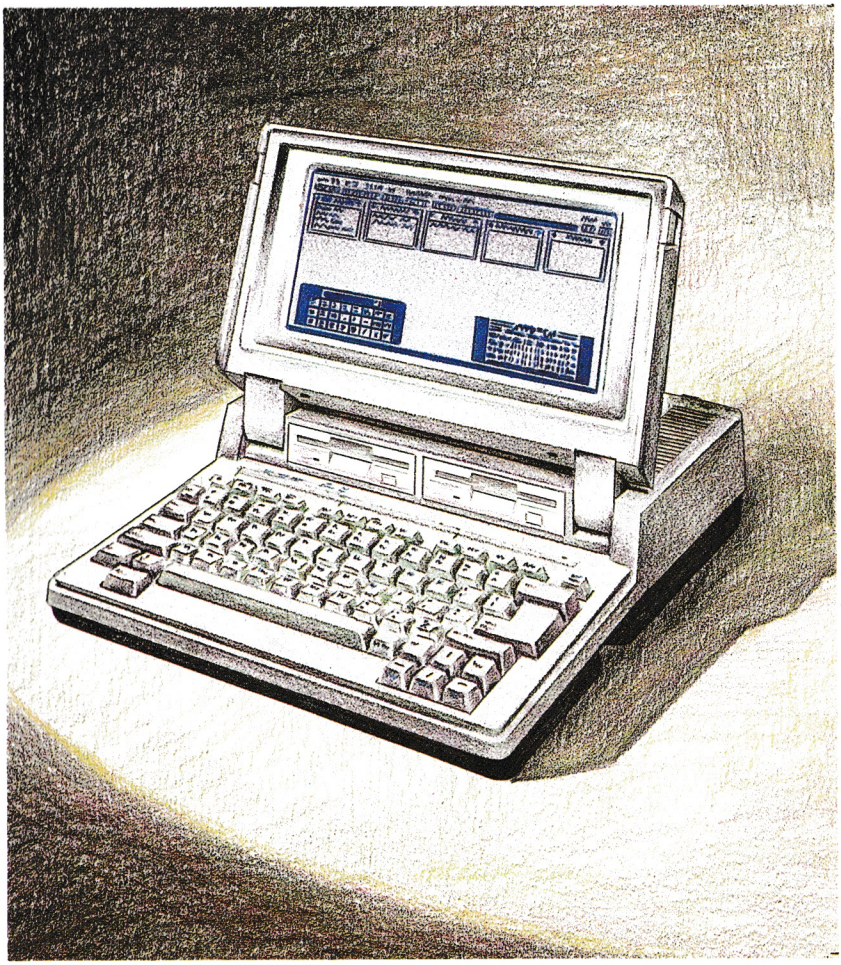
TANDY 1400 FD/HD

A Practical Guide



TANDY®

The FCC Wants You to Know

This equipment generates and uses radio frequency energy. If not installed and used properly, that is in strict accordance with the manufacturer's instructions, it may cause interference to radio and television reception.

It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient the receiving antenna
- Relocate the computer with respect to the receiver
- Move the computer away from the receiver
- Plug the computer into a different outlet so that computer and receiver are on different branch circuits.

Warning

This equipment has been certified to comply with the limits for a Class B computing device, pursuant to Subpart J of Part 15 of FCC Rules. Only peripherals (computer input/output devices, terminals, printer, etc.) certified to comply with the Class B limits may be attached to this computer. Operation with non-certified peripherals is likely to result in interference to radio and TV reception.

NOTICE: You must use shielded cable when connecting any peripheral device.

For your own protection, we urge you to record the serial number of this unit in the space provided. You will find the serial number on the bottom of the unit.

Serial Number _____

About This Book

Your owner's manual, *A Practical Guide to the Tandy 1400 FD/1400 HD,* includes:

- *Introduction to the Tandy 1400 FD/1400 HD*

  A general guide to your new computer that tells you everything you need to know to set up, operate, and maintain your Tandy 1400 FD/1400 HD. Several illustrations are provided to help you visualize the procedures and configurations discussed.

  Introduction to the Tandy 1400 FD/1400 HD includes all the computer hardware information you need to run application programs. If you require technical and/or more specific information about your hardware, consult the *Tandy 1400 FD/1400 HD Technical Reference Manual,* sold separately.

- *Introduction to MS-DOS*

  A guide to the MS-DOS® operating system for your computer, including instructions for starting and exiting the operating system as well as for preparing, using, and copying floppy diskettes. Information on some of the most commonly used MS-DOS commands is also included.

  Introduction to MS-DOS is an overview of your operating system. It includes sufficient operating system information for running your application programs on a daily basis. If you require more specific information, refer to the *MS-DOS Reference Manual.*

The *Tandy 1400 FD/1400 HD Quick Reference,* which is a separate manual in this package, provides you with condensed reference information for MS-DOS. A short listing of the major BASIC commands is also provided for your convenience. Refer to the *BASIC Reference Manual* for more information on the BASIC programming language.

These manuals provide you with all the information you need to get your computer "up and running" without having to wade through volumes of documentation.

This manual uses a simple method of notation to distinguish between what you enter and what you see on the screen.

Example	Description
[BACKSPACE]	Boxed characters represent keys that you press. These are usually function or command keys. It is unnecessary to press [ENTER] after you press one of these keys.
[CTRL] [C]	Two or more boxed keys together represent a key sequence that you press. For a key sequence, hold down the first key shown. Then, press the second key while still holding down the first key.
`format` [ENTER]	Text that you type (such as commands) is shown in a different typeface from the body of the manual. You must press [ENTER] after you type the text. In MS-DOS, you can type in both uppercase and lowercase letters.
`A>`	Text that appears on the screen, such as the system prompt, is shown in a typeface different from that used for the body of the manual and the commands you type.

Package Contents

Your Tandy 1400 FD/1400 HD package includes:

- The system unit and the AC adapter.
- The MS-DOS operating system/BASIC language diskette.
- This manual, *A Practical Guide to the Tandy 1400 FD/1400 HD.*
- The *Tandy 1400 FD/1400 HD Quick Reference.*

Caution: Before closing the cover of the computer, remove the diskette(s) from the drive(s).

Introduction to the
Tandy 1400 FD/1400 HD

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Introduction

Your Tandy® 1400 FD/1400 HD Personal Computer is a powerful, versatile, and simple-to-use computer. You can use it at home or take it with you as you travel, allowing you immediate access to your most important business or personal information. Everything you need to begin is included with your computer.

Features

- IBM® PC software compatibility.
- Full portability.
- A dual-speed 4.77/8.0 MHz, 16-bit V-20 CPU chip. The dual speed lets you choose the processing speed appropriate for your software application.
- 768 kilobytes (768KB) of system RAM memory.
  (A kilobyte equals 1,024 bytes or characters of information.)
- Two built-in 3 1/2-inch 720KB floppy disk drives (Tandy 1400 FD).
- One built-in 3 1/2-inch 20MB hard disk drive and one 3 1/2-inch 720KB floppy disk drive (Tandy 1400 HD).
- Built-in support for a printer, a color graphics monitor, and an RS-232C adapter. You do not need extra adapter cards for these features.
- Built-in speaker for sophisticated sound and music generation.
- Full-feature, 76-key IBM XT-compatible keyboard.
- MS-DOS Version 3.30 operating system and Version 3.20 GW™-BASIC language diskette.
- An LCD (liquid crystal display) that displays 25 lines and 80 columns.

Options

- An RGB monitor.
- A parallel printer. (A standard DB-25 male to 36-pin plug parallel printer cable, such as our Cat. No. 26-227 or 26-223, is required.)
- An external keyboard, such as our Enhanced Keyboard (Cat. No. 25-4032).
- An external 5 1/4-inch floppy disk drive.
- The 8087-2 Math Coprocessor Chip Kit (requires installation). The coprocessor speeds up the internal numeric calculations and reduces computing time when used with compatible software.
- The Internal Modem Board for communications.
- Universal RS-232C Communications Serial Cable. (Standard DB-9 female to DB-25 male serial cable, such as Cat. No. 26-1399.)
- The Hard Disk Drive Kit for Tandy 1400 FD (requires installation). The kit replaces the right floppy disk drive with a hard disk drive.

Choosing a Work Area

When you choose a work area for the Tandy 1400 FD/1400 HD, keep in mind that you need a hard, clean, and flat work surface that is sturdy enough to hold your system. Choose a surface that is at a convenient height for typing. Also be sure that the work area is well lit.
Set up the system, including cables, in a location free or distant from:

- Dust, moisture, and direct exposure to sunlight. These can create a fire hazard and cause system or device malfunctions.
- Objects that radiate heat. These types of objects can damage the case and cause other problems.
- Objects that yield strong electromagnetic fields, such as speaker systems.
- Liquids and corrosive chemicals.

Keep a reasonable clearance space around the ventilation holes and at the top of each system and optional device.

When you operate the system, the ambient temperature and relative humidity of the room should be within the following ranges:

Operating	: 41° – 95°F (5° – 35°C) (non-condensing)	20 – 80%
Non-operating:	−4° – 140°F (−20° – 60°C) (non-condensing)	10 – 80%

Avoid severe temperature and humidity change.

Handling

Take care not to drop the system or peripherals on the floor as you set them up.

Although the system is designed to be resistant to vibration and shock, avoid violent shocks to, or vibrations of, the system and optional devices while in use or in storage.

Cleaning

Use a dry, soft cloth to clean the computer's case. Do not use any chemical products, such as benzine or thinner, to clean the case.

Floppy Disk Drive Tips

- Insert a diskette squarely into the drive slot.
- Never insert more than one diskette into a drive.
- Do not remove or insert a diskette while the drive activity light is on.
- Do not use damaged diskettes.

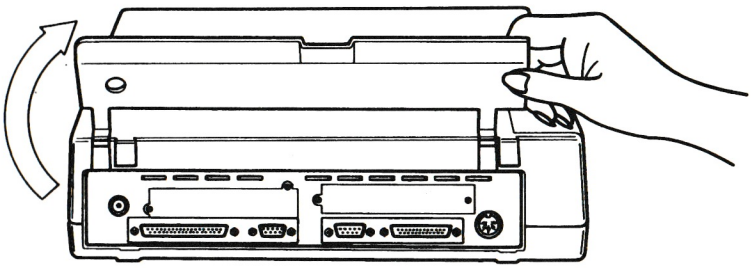
Setup

This section provides information to help you set up and begin using the Tandy 1400 FD/1400 HD. Your computer includes built-in support for an RGB color monitor as well as for a parallel printer and an RS-232C device. If you are adding an optional unit, refer to "Installing Options" before you set up your computer.

> **Warning:** Completely assemble the system and optional devices before using them. Using a partially dismantled system can cause accidents or electrical shock.

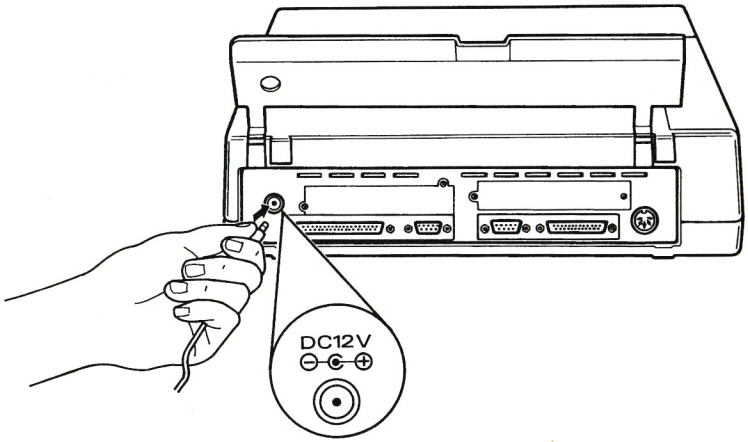
Follow these steps to set up your computer:

1. Remove the computer from the box. Save the packing materials in case you transport your system in the future.
2. Set the system on a flat surface.
3. Open the rear connector panel by pulling up on its cover.



Note: If you are not connecting any peripheral device, you can connect the AC adapter's plug through the hole in the rear cover, without opening the cover.

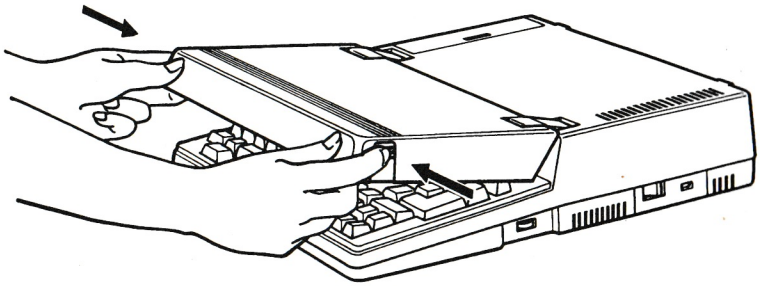
4. Plug one end of the AC adapter into the AC ADAPTER jack on the back of the system.



5. Plug the other end of the AC adapter into a standard AC outlet (60Hz, 120V ± 10%).

   Note: The internal rechargeable battery must be charged before you can operate the system using battery. Initially, charge the system for 15 hours. Then, disconnect the adapter from the AC outlet and the computer. See "Power Sources" in "The System Unit" for more information on the battery.

6. Push the two latches on the sides of the system at the same time, and raise the display screen.

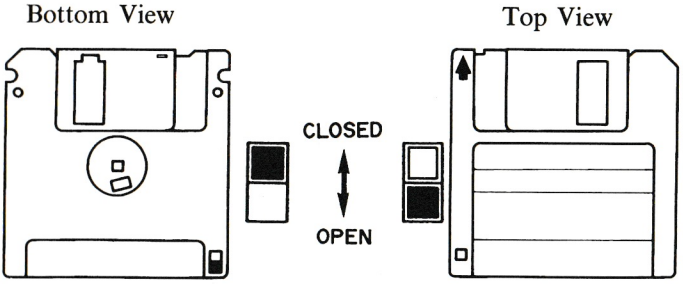


Caution: Before you close the computer, always remove the diskette(s) from the drive(s).

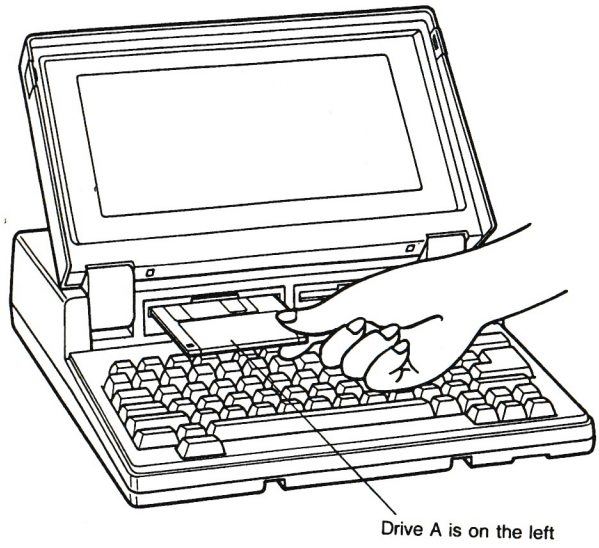
1400 FD Start Up

Starting up your computer and initializing the MS-DOS operating system prepares the computer for use. To start up your system, follow these instructions.

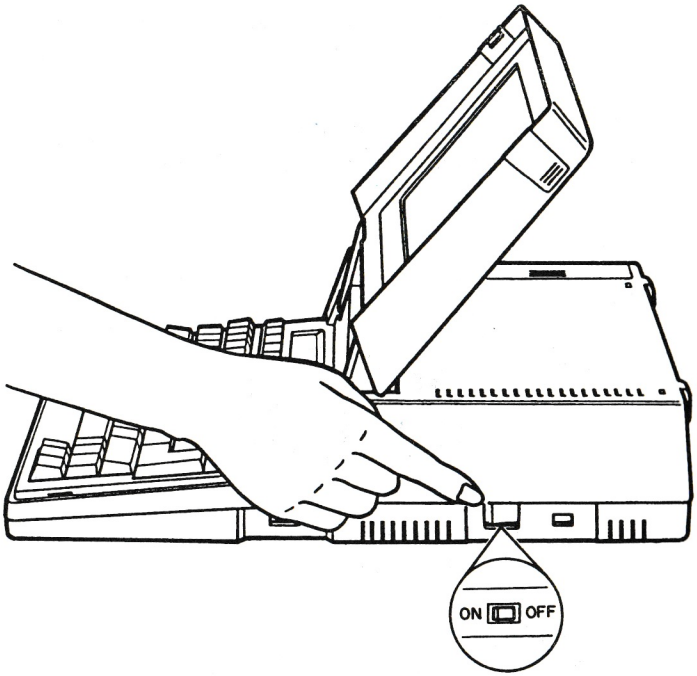
1. To write-protect the MS-DOS/BASIC system diskette so that the programs and data on it are protected, slide the tab down to open the hole.



2. Hold the diskette with the label side up. Push the diskette into Drive A until it clicks into place.



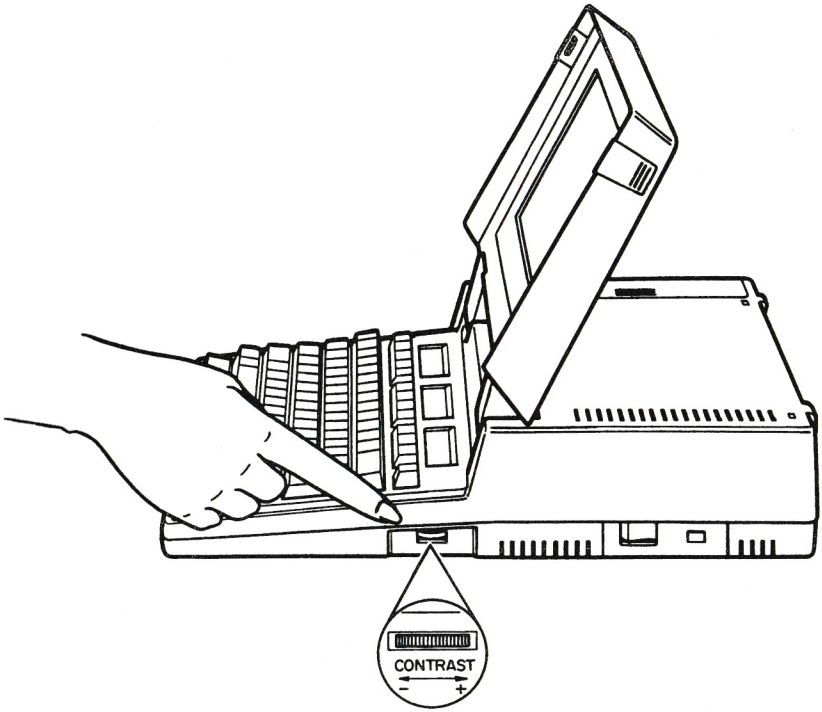
3. Move the power switch on the right side of the unit to ON.



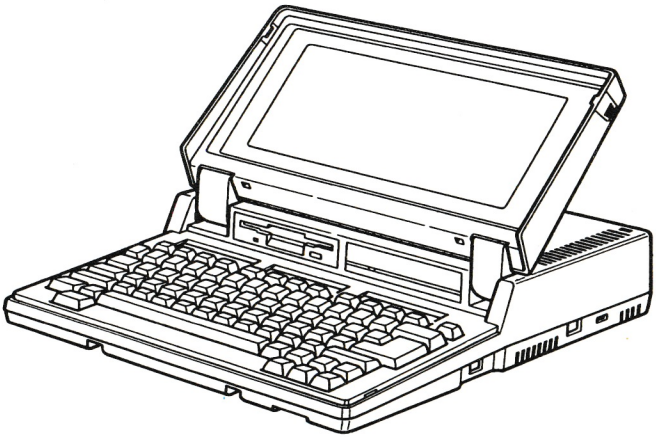
The screen shows:

```
ROM BIOS Version X.XX
Base Memory Size 640K Byte
Expansion Memory Size 128K Byte
CPU Clock 8.00 MHz

Microsoft MS-DOS Version 3.30
(C) Copyright Microsoft Corp 1981-1987
Tandy version 03.30.01
Licensed to Tandy Corp.
All rights reserved.

Current date is Fri 8-07-1987
Enter new date (mm-dd-yy):
```

4. Adjust the contrast of the LCD screen using the CONTRAST dial on the right side of the unit.



5. Tilt the screen until it is at a comfortable viewing angle.



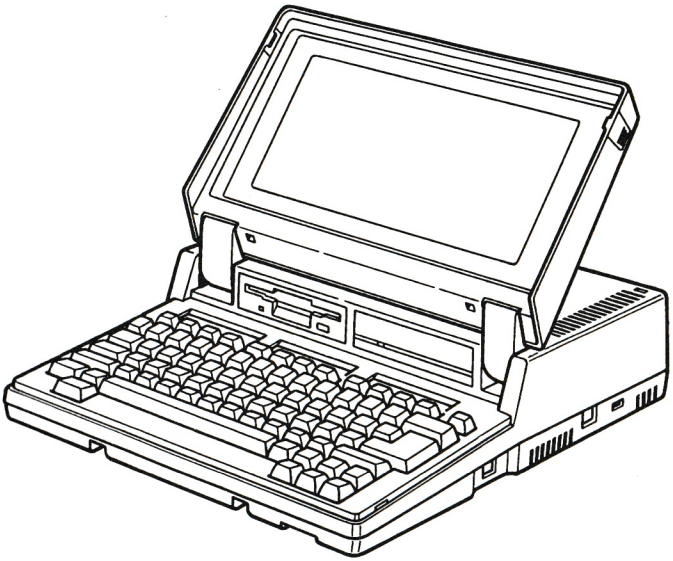
6. Enter the date and time, following the sample format on the display. Press [ENTER] to end each entry. If you do not want to change the date and time that are shown, press [ENTER] at each prompt. (Note that MS-DOS represents time in 24-hour format.)

MS-DOS completes the start-up procedure and displays the system prompt. The system prompt is the current drive reference followed by a "greater than" symbol (A>). You can now enter the operating system command to instruct MS-DOS to perform tasks and run application programs.

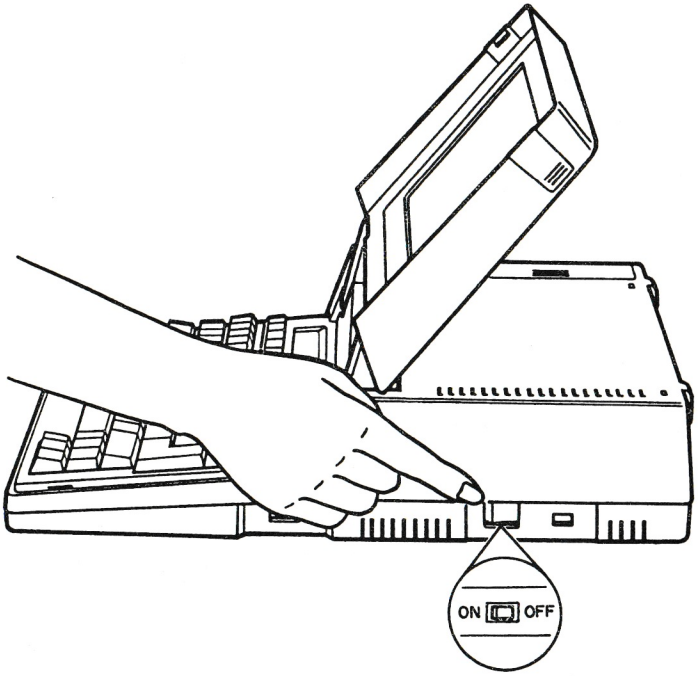
1400 HD Start Up

As supplied, the 1400 HD comes with the hard disk preformatted and all MS-DOS and BASIC files installed. Starting your computer is easy.

1. Be sure no floppy diskette in Drive A.



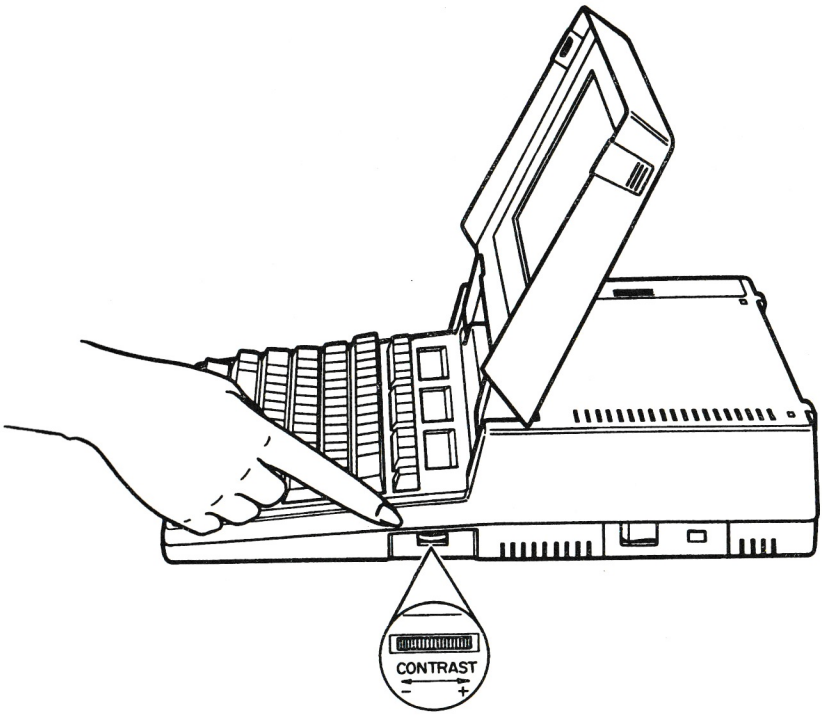
2. Move the power switch on the right side of the unit to ON.



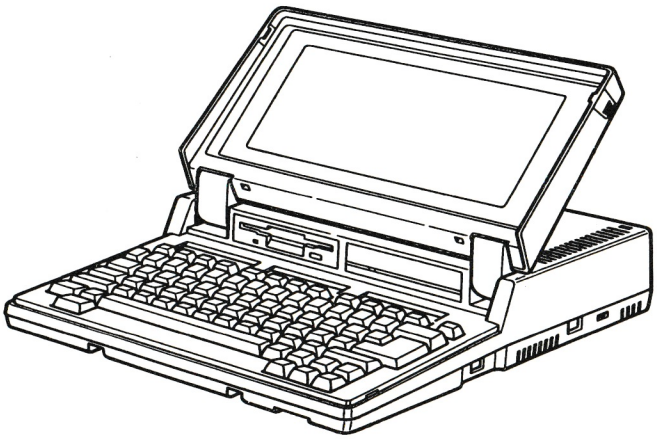
The screen shows:

```
ROM BIOS Version X.XX
Base Memory Size 640K Byte
Expansion Memory Size 128K Byte
CPU Clock 8.00 MHz

Microsoft MS-DOS Version 3.30
(C) Copyright Microsoft Corp 1981-1987
Tandy version 03.30.01
Licensed to Tandy Corp.
All rights reserved.

Current date is Fri 8-07-1987
Enter new date (mm-dd-yy):
```

3. Adjust the contrast of the LCD screen using the CONTRAST dial on the right side of the unit.



4. Tilt the screen until it is at a comfortable viewing angle.



5. Enter the date and time, following the sample format on the display. Press [ENTER] to end each entry. If you do not want to change the date and time that are shown, press [ENTER] at each prompt. (Note that MS-DOS represents time in 24-hour format.)

MS-DOS completes the start-up procedure and displays the system prompt. The system prompt is the current drive reference followed by a "greater than" symbol (C>). You can now enter the operating system command to instruct MS-DOS to perform tasks and run application programs.

Note: If at anytime you should need to re-format the hard disk, follow this procedure.

1. Use BACKUP to copy all of the hard disk's files to floppy diskette(s).
2. Insert the MS-DOS/BASIC diskette into Drive A.
3. Type a: to change the current drive to Drive A.
4. Use HSECT to perform the low level format (use an interleave factor of 2).

Note: See the bottom of your unit for the known bad sector numbers.

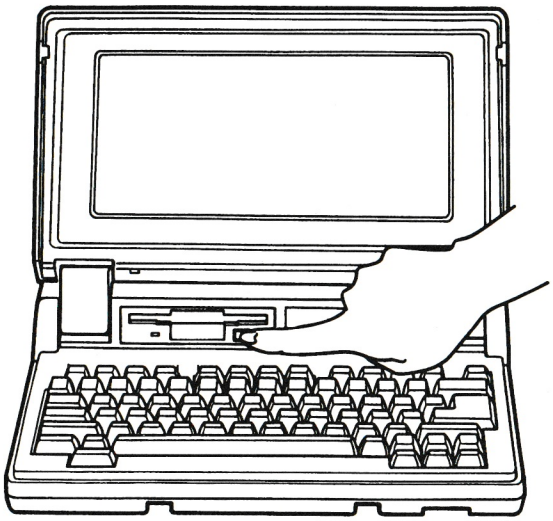
5. Use FDISK to create partition(s).
6. Use FORMAT so you can start up from the hard disk.
7. Use RESTORE to move your files back onto the hard disk.

For details of each command, refer to the *MS-DOS Reference Manual.*

Turning Off Your System

Many application programs let you exit the program by pressing BREAK or CTRL C. However, abruptly halting execution of a program in this manner can sometimes result in loss of data. Further, some operations must complete their functions before you can stop the operation. Be sure the software you are using supports BREAK or CTRL C before you use either.

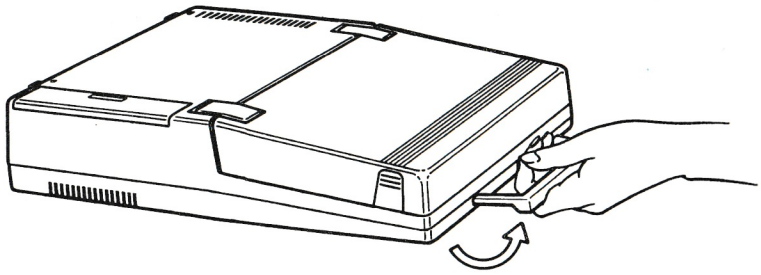
To protect your data, we recommend that you exit your application program and return to the system prompt before you turn off your system. Be sure that the system prompt appears on the screen. Then, if you have a diskette in the drive, push the eject button until it pops out.



To turn off the system, remove all diskettes and store them in their protective envelopes. Then move the power switch to OFF.

Traveling

If you are traveling with the 1400 FD/1400 HD, you can carry the system unit easily by using its pull-out handle. Handle the unit carefully and avoid excessive vibration and shock.



The System Unit

Now that your system is set up, take a few moments to familiarize yourself with the system unit. The system unit includes the central processing unit (CPU), two floppy disk drives, (Tandy 1400 FD), or one hard disk and one floppy disk drive (Tandy 1400 HD), the keyboard, and the LCD screen.

The Tandy 1400 FD Floppy Disk Drives

You use the floppy disk drives to start up MS-DOS and to store programs and data on diskettes. To insert a diskette into a drive, gently slide it, label side up, into the drive.

A drive's activity light is on whenever the drive is reading from or writing to a diskette.

> **Caution:** Removing a diskette from a drive when the drive's activity light is on can destroy the data on the diskette.

To remove a diskette from a drive, be sure the drive activity light is off. Push the diskette eject button until the diskette pops out, and pull out the diskette.

The Tandy 1400 FD has two internal 720K floppy disk drives.

The left floppy disk drive is the primary drive, usually referred to as Drive A. The right floppy disk drive is the secondary floppy disk drive, usually referred to as Drive B. An optional external floppy disk drive is referred to as Drive C. The operating system and most application programs operate from the primary drive, Drive A. The secondary drive is normally used for a data or utilities diskette.

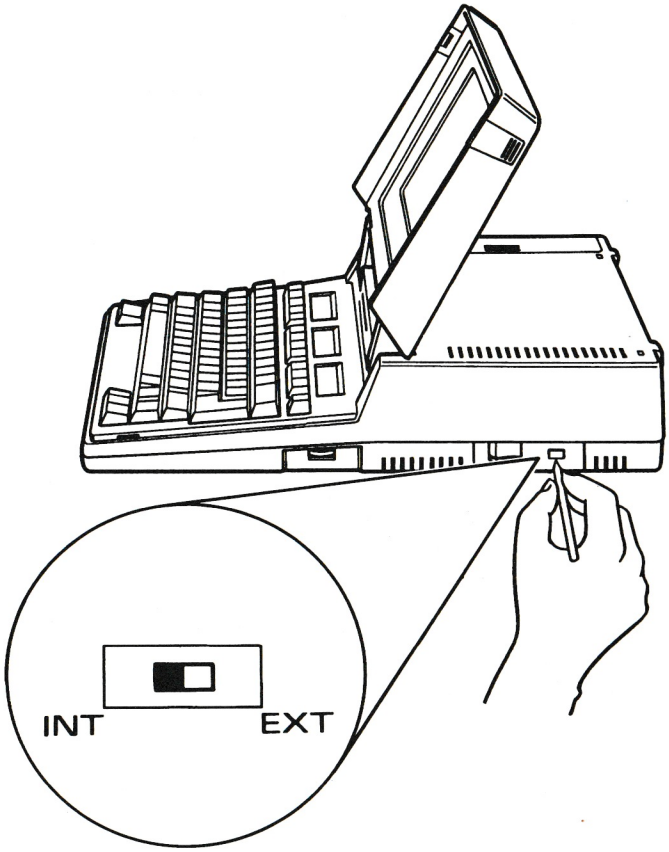
> **Note:** When you use an external floppy disk drive, you can change the drive designations. Use the drive select switch on the right side of your system. With the drive select switch set to INT, the drives are designated as follows:

Left Drive	Drive A
Right Drive	Drive B
External Drive	Drive C

With the drive select switch set to EXT, the drives are designated as follows:

Left Drive	Drive C
Right Drive	Drive B
External Drive	Drive A

If Drive A is located internally, set the drive select switch to INT.
If Drive A is located externally, set the drive select switch to EXT.



The Tandy 1400 HD Hard Disk Drive and Floppy Disk Drive

A hard disk can store much more information than a diskette, and your computer takes less time to find information on a hard disk. The Tandy 1400 HD has an internal hard disk and a floppy disk drive. The hard disk drive can store 20 million characters (20M). It is referred to as Drive C. The 720K floppy disk drive is referred to as Drive A. An optional external floppy disk drive is referred to as Drive B. The operating system and most application programs can be operated either from Drive A or Drive C.

The hard disk drive's activity light is on whenever the computer accesses the hard disk.

> **Caution:** Do not turn off the computer when the activity light is on. It can destroy the data on the disk.

When you store programs (such as MS-DOS) and other information on a hard disk, you should keep backup copies of the programs and data on diskettes. This prevents the loss of all your programs and data if the hard disk is accidentally damaged.

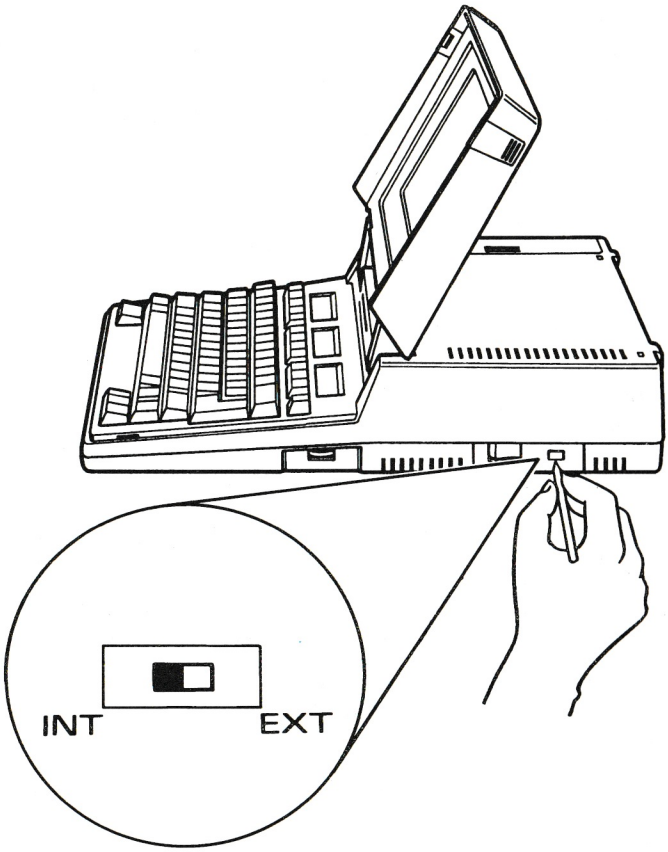
The floppy disk drive's activity light is on whenever the drive is reading from or writing to a diskette.

> **Caution:** Removing a diskette from a drive when the drive's activity light is on can destroy the data on the diskette.

To remove a diskette from a drive, be sure the drive activity light is off. Push the diskette eject button until the diskette pops out, and pull out the diskette.

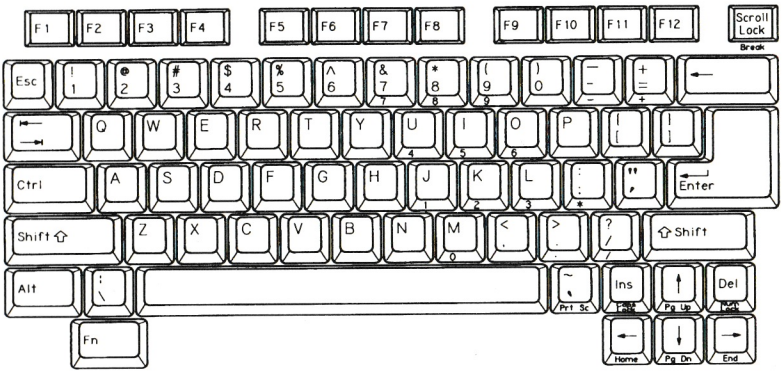
> **Note:** When you use an external floppy disk drive, you can change the drive designations. Use the drive select switch on the right side of your system. With the drive select switch set to INT, the drives are designated as follows:
>
> | | |
> |---|---|
> | Left Drive | Drive A |
> | Hard Disk | Drive C |
> | External Drive | Drive B |
>
> With the drive select switch set to EXT, the drives are designated as follows:
>
> | | |
> |---|---|
> | Left Drive | Drive B |
> | Hard Disk | Drive C |
> | External Drive | Drive A |

If Drive A is located internally, set the drive select switch to INT.
If Drive A is located externally, set the drive select switch to EXT.



The Keyboard

Your computer's keyboard consists of four sections: the function keys, the typwriter keys, the numeric keypad, and the cursor keys.



Function Keys

The function keys at the top of the keyboard are *program-specific*. Their functions depend on the program you are running. Some of these keys perform special functions when you start the computer, such as:

[CTRL] [ALT] [F12] LCD mode. Pressing this key combination tells the computer to use the built-in LCD screen instead of an external color monitor.

[CTRL] [ALT] [F11] External color/graphic mode. Pressing this key combination tells the computer to use an external color monitor instead of the built-in LCD screen.

Typewriter Keys

The main part of the keyboard, below the function keys, is similar to the keyboard of a standard typewriter. However, when you hold down a character or number key, the keystroke repeats automatically until you release the key. This section of the keyboard also contains some keys not found on a standard typewriter.

[ESC] The function of the [ESC] key depends on the program you are running.

[CTRL] You use the [CTRL] key in combination with certain other keys to perform specific operations. The combinations available and their functions are program-dependent. To use a [CTRL] key combination, hold down the [CTRL] key, and press the other key. For example, [CTRL] [C] performs a break or program interrupt in many programs.

Note: Some software manuals refer to [CTRL] as [CNTRL].

[ENTER]

The [ENTER] key enters commands and data into the computer. After you press [ENTER], the command you entered is processed by the program or operating system you are running.

> **Note:** Some software manuals might refer to [ENTER] as [RETURN] or [↵].

[ALT]

You use the [ALT] key in combination with certain other keys to perform specific operations. The combinations available and their functions are program-dependent. To use an [ALT] key combination, hold down [ALT], and press the other key.

[FN]

You use the [FN] in combination with cursor keys, [INS], [DEL], or [~] to perform the functions labeled in blue on your keyboard.

[INS]

The function of the [INS] key depends on the program you are running. In some programs, this key changes the typing mode from the normal overstrike (type-over) mode to the insertion mode so that you can insert data into a line of text. Pressing the key again returns the keyboard to the overstrike mode.

[FN] [INS]

Pressing the [FN] and [INS] key combination causes the alphabet keys to produce only capital letters. (This function affects only the keys A-Z.) The light on the upper part of the keyboard indicates when the keyboard is in the caps lock mode. Press this key combination once to activate the mode. Press the keys again to return to the normal typing mode.

[DEL]

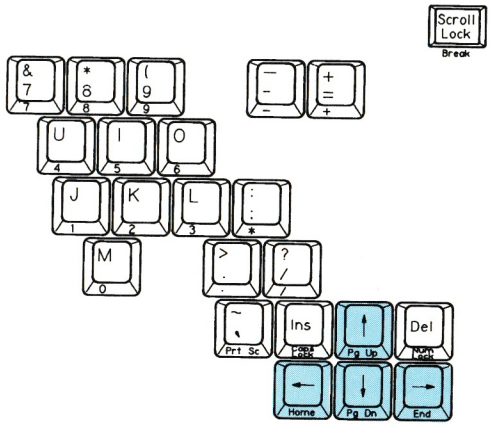
The function of the [DEL] key depends on the program you are running. In some programs, this key erases the character at the current cursor position.

FN DEL	The FN and DEL key combination reverses the function of the numeric keypad at the right of the keyboard, activating a "number lock" mode. When this mode is active, the numeric keypad provides a calculator-like pad for entering numbers in application programs. It includes the numbers, operators (−, +, /, and *), and punctuation labeled in blue on the keyboard. The light on the upper part of the keyboard indicates when the keyboard is in "number lock" mode. Press the key combination once to activate the mode. Press the combination again to return to the normal keyboard mode.
SCROLL LOCK	The function of the SCROLL LOCK key depends on the program you are running. Its use is defined in your operating system or application program manual.
FN ~	Sends everything currently displayed on the screen to the printer.
CTRL SCROLL LOCK	The function of this key combination depends on the program you are running. In some programs, this combination causes a break, halting program execution.

Numeric Keypad

The numeric keypad on the right side of the keyboard is arranged the same as a calculator keypad. Press the FN and DEL keys at the same time to use the keypad for extensive number entry. When number lock is on, the NUM LOCK indicator on the upper part of the keyboard lights. The values of the keys on the numeric keypad are 0 – 9, decimal (.), addition (+), subtraction (−), multiplication (*), and division (/) as printed in blue on the keyboard. Press the FN and DEL key combination again to return to the normal keyboard mode.

Cursor Keys



The arrow keys at the lower right of the keyboard are cursor control keys. Pressing a cursor key moves the cursor one position in the direction of the arrow. Holding down a cursor key repeats the action.

FN ←	Executes a "home" function. The function depends on the program you are running. In some programs, "Home" moves the cursor to the upper left corner of the screen.
FN →	Executes an "end" function. The function depends on the program you are running. In some programs, "End" moves the cursor to the right of the last character in the current line.
FN ↑	Executes a "page up" function. The function depends on the program you are running.
FN ↓	Executes a "page down" function. The function depends on the program you are running.

Control Key Combinations

CTRL ALT DEL — Resets all system hardware and loads the system programs from the system diskette (if the system diskette is in Drive A or you installed MS-DOS on the hard disk of Tandy 1400 HD).

CTRL ALT INS — Changes the computer to Setup mode. (For detailed information about this mode, see the chapter entitled "Setup Mode.") In Setup mode, the display shows:

Key Definition	Current Setting
F1 : Set time for Standby Mode	0:10
F2 : LCD/CRT	LCD CRT
F3 : Internal/External Keyboard	INT EXT
F4 : COM1/COM2 Setup	RS/MODEM MODEM/RS
F5 : Direct Modem/Acoustic Coupler	DIRECT ACOUS
F6 : Internal/External Screen Controller	INT EXT
F7 : CPU Clock (MHz)	8.00 4.77
F8 : Date (MM-DD-YYYY)	02-17-1988
F9 : Time (HH:MM:SS)	18:28:30
Press ESC to Exit	

This display lets you decide on certain hardware options and indicate your choice to the 1400 FD/1400 HD. In Setup mode, the function keys perform as follows:

F1 Lets you enter the time you want to elapse between the last time you use the computer and its automatic shut off.

F2 Lets you choose between using the built-in display or an external monitor.

F3 Lets you choose between using the built-in keyboard or an external one.

F4 Lets you choose either COM port1 or COM port2 for an internal modem board and the RS-232C port.

F5 If you are using an internal modem board, lets you choose between using a direct modem connection or an acoustic coupler connection.

F6 Lets you choose between using the internal display controller or an external color monitor controller.

F7 Lets you choose between an internal clock speed of 8.0 MHz or 4.77 MHz.

F8 Lets you set the date of the real time clock.

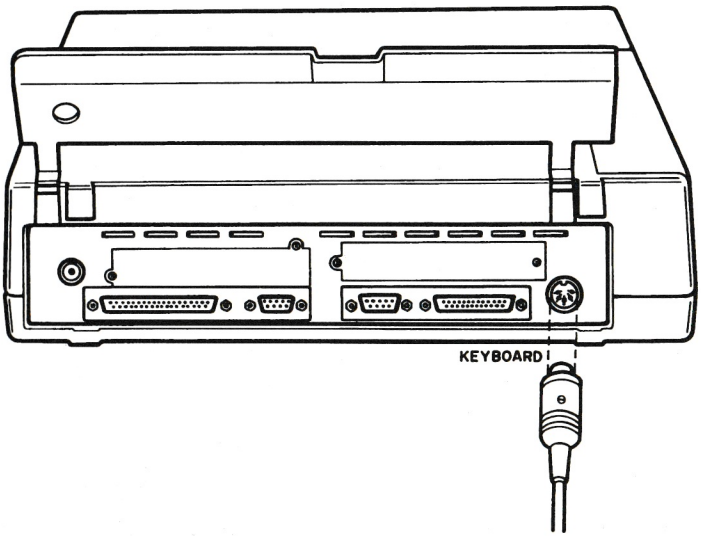
F9 Lets you set the time of the real time clock.

Using an External Keyboard

The Tandy 1400 FD/1400 HD provides a connection port on the back of the system for an optional external keyboard. You can connect a Tandy Enhanced Keyboard (Cat. No. 25-4032) or an IBM PC-compatible keyboard. If you wish, connect the external keyboard, and select EXT during Setup mode. (See the chapter entitled "Setup Mode" for more information.)

Be sure that you are familiar with the way the external keyboard works before you use it with the 1400 FD/1400 HD.

Note: If you are using an enhanced keyboard, it must be set to IBM XT-compatible mode. The Tandy Enhanced Keyboard defaults to this mode.



Using the Built-in Display or an External Monitor

You can use the built-in LCD, or you can connect an external RGB color monitor to the computer.

The LCD

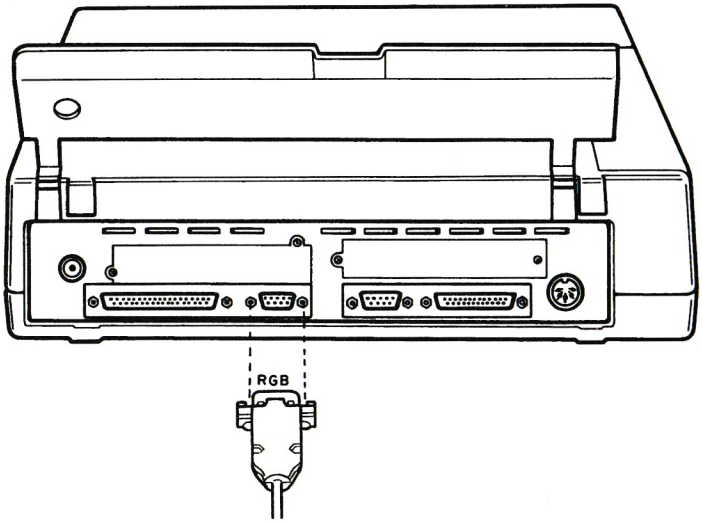
The Tandy 1400 FD/1400 HD display is a 25-line by 80-column dot matrix LCD, capable of emulating IBM standard CGA graphics.

When you use the LCD, adjust the display until it is at a comfortable viewing angle. The display stays at the angle you select. To adjust the contrast, use the contrast dial on the right side of the unit. To assure a clear image, your work area must have adequate lighting.

Operating or storing the system unit in high temperatures or in a high-humidity environment for a long time shortens the life of the display. If the display ever becomes too faint to read, take the unit to your local Radio Shack service center for replacement of the backlight.

Color Monitor

To use an RGB color monitor, connect its cable to the nine-pin D-Sub female connector inside the connector compartment on the rear of the system. Fasten the cable with screws. Connect the monitor's power cord to an AC power source. Turn on the monitor.



Selecting a Display Device

You can specify to the 1400 FD/1400 HD the type of display you are using (internal LCD or external color monitor) in the following two ways:

- Using the function keys

  Press [CTRL] [ALT] [F12] if you powered up using a color monitor as the default display. This tells the computer to use the LCD. If you powered up using the LCD as the default display, press [CTRL] [ALT] [F11] to tell the computer to use the color monitor.

- Using the Setup mode

  Enter the Setup mode by pressing [CTRL] [ALT] [INS]. The [F2] function key lets you make the selection. Move the cursor to select the type of display, and then press [ENTER]. The highlighted device is now enabled. Press [ESC] to exit Setup mode. (See the "Setup Mode" chapter for more information.)

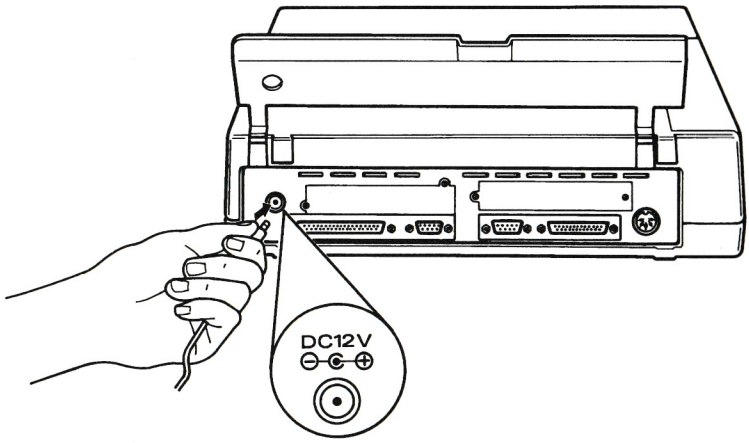
Power Sources

Your Tandy 1400 FD/1400 HD comes with a custom battery pack that allows portable operation of your system.

Using the battery, you can operate the Tandy 1400 FD for approximately four hours and the Tandy 1400 HD two hours under the following conditions:

- No options installed
- Internal disk drives run no more than 10% of the operation time.
- The battery is fully charged

When the battery drains below normal operation requirements, the LOW BATT indicator lights up and sounds two beeps. The computer will run for approximately 30 minutes longer. If the battery drains further, the indicator starts to blink, and five beeps sound. Plug in the AC adapter immediately. If you continue to use the battery, the computer's memory contents will be lost. If you cannot charge the battery immediately, refrain from using the system.



The battery charging time depends on the amount that the battery has been exhausted. If the battery is almost fully discharged, it takes approximately 15 hours to completely charge it with the system power turned off. With the system turned on, it takes longer to charge the battery.

The computer provides a Standby mode to avoid unnecessary consumption of battery power. The computer automatically enters the Standby mode if it receives no key input from you for a preset time. When you press an any key, the Standby mode is released and the previous screen appears.

You can adjust the time that elapses before the unit enters the Standby mode. Press [CTRL] [ALT] [INS] to enter Setup mode. Press [F1], and set the desired time length. You can select from one minute to three hours, 59 minutes, in one-minute increments.

While the computer is in the Standby state, the Standby indicator on the upper right of the keyboard is lit. Fully charged battery can retain the memory contents for approximately 11 hours. As in the normal operation mode, the LOW BATT indicator lights when the battery power becomes weak. Though the battery can then retain the memory contents for approximately one more hour, we suggest that you plug in the AC adapter.

Caution: As in the normal operation mode, the LOW BATT indicator eventually begins blinking and sounds five beeps. If the battery becomes completely exhausted, the memory contents will be lost.

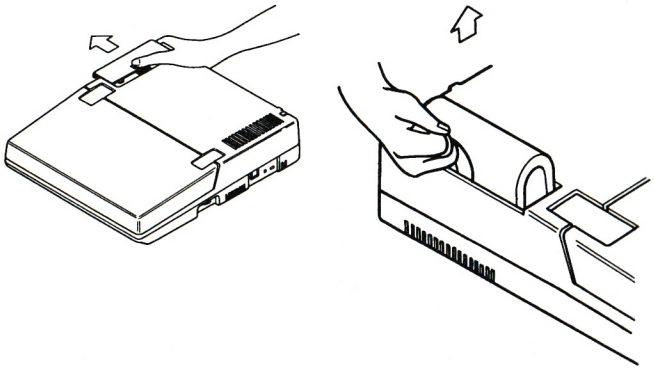
Notes:

- Using an AC adapter other than the one supplied will cause the battery or the system unit components to fail.
- When you do not intend to either use the system via the AC adapter or recharge the battery, unplug the AC adapter from the wall outlet.

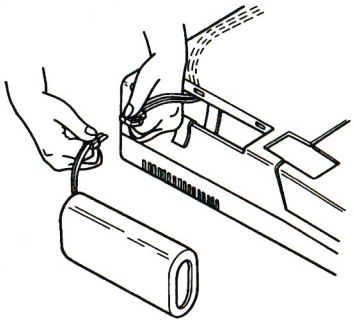
The average life of the battery pack is normally three years. However, if you leave the battery completely discharged or **overcharge** them, the battery wears down prematurely.

Replacing Battery

1. Turn the power switch off and unplug the AC adapter. Disconnect all peripherals.
2. Remove the battery cover on the left top of the unit.
3. Pull on the ribbon to lift out the battery pack.



4. Unlock the latch on the connector and detach the old battery pack.
5. Push the cable from the new battery pack onto the connector until you hear a click.



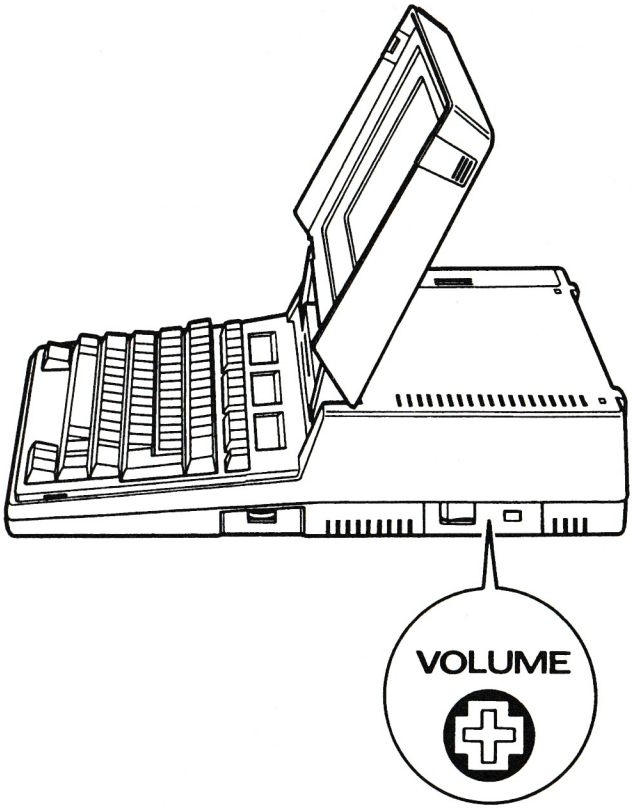
6. Store the new battery pack in the compartment.

   Caution: Before closing the battery cover, be sure that the battery cords are neatly stuffed between the battery pack and the rear panel not routed over the battery pack.

7. Replace the battery cover.
8. Reconnect all the peripherals.

Adjusting the Speaker Volume

You can adjust the volume of the computer's speaker. The variable resistor that controls the speaker output level is located on the right side of the computer. Turn the resistor counterclockwise to increase the volume or clockwise to decrease the volume.



Using Diskettes

The floppy disk drive(s) in the Tandy 1400 FD/1400 HD use double-sided, double-density, 3 1/2-inch diskettes (Cat. No. 26-417 and 26-418). These diskettes can store approximately 720K bytes (more than 736,000 characters) of information.

Care and Handling of Floppy Diskettes

Be sure to handle floppy diskettes carefully. A scratch, small indentation, or even a speck of dust can destroy data on a diskette. To protect your diskettes (and the information they contain) from damage, follow these guidelines:

- Keep diskettes away from magnetic fields (such as transformers, AC motors, magnets, TVs, and radios).
- Never lay a diskette on top of or next to the computer system's console.
- Handle diskettes with the shutter closed. Never touch the recording surface. Never try to wipe or clean the recording surface.
- Keep diskettes out of direct sunlight and away from excessive heat.
- Keep diskettes away from cigarette ashes, dust, and other particles. In dusty areas, use filters to clean the air.

The MS-DOS/BASIC Diskette

The MS-DOS/BASIC diskette provided with your computer contains the *disk operating system*, which is necessary to run application programs on your computer. The BASIC programming language for your computer is also on this diskette. Make a copy of the diskette, and then always use the copy to run your computer. Refer to *"Floppy Disk Drives and diskettes"* of the *Introduction to MS-DOS* for details.

Refer to *Introduction to MS-DOS* and the "MS-DOS" section of the *Tandy 1400 FD/1400 HD Quick Reference* for information on using the MS-DOS operating system. Refer to the "BASIC" section of the *Tandy 1400 FD/1400 HD Quick Reference* for information on using the BASIC programming language.

Installing Options

You can add several internal options to your Tandy 1400 FD/1400 HD, such as:

- A math coprocessor
- An internal modem board
- A hard disk drive kit for 1400 FD

Caution: Before installing or removing an optional board in your Tandy 1400 FD/1400 HD, turn off the system, and disconnect the AC adapter. Installing or removing a board with the power on can damage the option board as well as the main logic board.

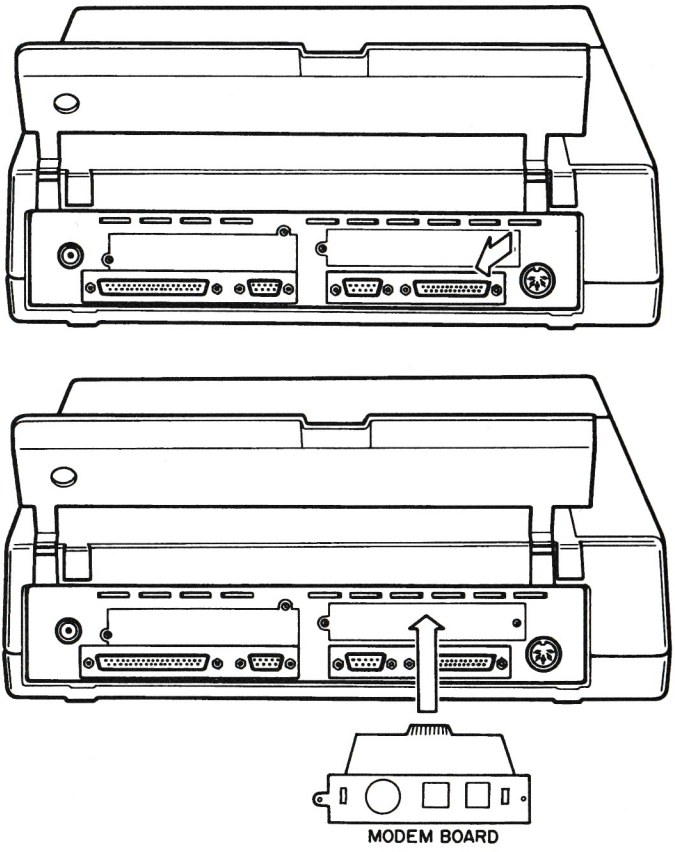
If you wish to add a math coprocessor or hard disk drive kit, it must be installed by a qualified service technician. (See your local Radio Shack store or computer center.).

Installing an Internal Modem Board

You can have access to on-line services, such as CompuServe® and Dow-Jones News Retrieval®, by installing an internal modem board.

The slot for the optional internal modem board is located on the right side of the rear panel. To install a board, follow these steps:

1. Turn off the power switch, and unplug the AC adapter.
2. Loosen the screws that hold the slot cover and remove the cover.
3. Insert the internal modem board in the slot with the component side of the board facing up.
4. Secure the modem with the two screws removed from the slot cover.



Setup Mode

As noted previously, you can change several of the computer functions by using Setup mode. Press [CTRL] [ALT] [INS] to enter the Setup mode. To change the system setup during the execution of application software, the screen must be in the character mode and able to accept keyboard input.

The screen in Setup mode shows:

Key Definition	Current Setting
F1 : Set time for Standby Mode	0:10
F2 : LCD/CRT	LCD CRT
F3 : Internal/External Keyboard	INT EXT
F4 : COM1/COM2 Set up	RS/MODEM MODEM/RS
F5 : Direct Modem/Acoustic Coupler	DIRECT ACOUS
F6 : Internal/External Screen Controller	INT EXT
F7 : CPU Clock (MHz)	8.00 4.77
F8 : Date (MM-DD-YYYY)	02-17-1988
F9 : Time (HH:MM:SS)	18:28:30
Press ESC to Exit	

Use the appropriate function key to select the item you want to specify or change.

F1 Sets the time that elapses before the computer enters the Standby mode.

Press F1 for Standby mode, and the hours digit is highlighted. Type the desired number of hours you want to elapse before Standby mode becomes active (**0**, **1**, **2**, or **3**), and press ENTER. The cursor moves to the minutes digits. Enter the desired number of minutes (00-59) in the same way. If 00:00 is entered, the standby mode becomes inactive (off).

F2 Selects the type of display, LCD or an external color monitor.

Press F2, and the current setting is highlighted. Select the type of display you are using by pressing the left or right arrow keys. After highlighting the desired type of display, press ENTER.

F3 Selects either the internal or an external keyboard.

Press F3, and the current setting is highlighted. Select the type of keyboard you are using via the arrow keys, and press ENTER. Note that the input device changes immediately when you press ENTER. Also, the Setup mode must be completed from the selected device. (When no external keyboard is connected, you cannot select the EXT setting.)

F4 Selects either COM portl or COM port2 for an optional internal modem and an RS-232C port.

Press F4, and the current setting is highlighted. The Tandy 1400 FD/1400 HD has two serial I/O channels, and COM1 is set to the RS-232 and COM2 is to the internal modem. To change the default, press the right arrow key. After highlighting MODEM/RS, press ENTER. The internal modem is set to COM1 and the RS-232 is COM2.

F5 Selects either a direct modem or an acoustic coupler.

Press F5, and the current setting is highlighted. Make your selection by using the arrow keys, and press ENTER.

F6 Selects either the internal or external display controller.

Use this setting to suppress the internal display controller when the external video controller is connected via the optional expansion bus board/expansion box.

Press F6, and the current setting is highlighted. Select the display controller you want by using the arrow keys, and press ENTER. Note that the display controller changes immediately when you press ENTER. (When no external display controller is connected, you cannot select EXT.)

F7 Selects the system clock speed.

Press F7, and the current setting is highlighted. Select the clock frequency you want by using the arrow keys, and press ENTER. Note that when the system is turned off and then on again, it runs at the clock frequency previously selected.

The selection of the clock frequency is provided to enable you to use software that cannot run at the higher CPU speed.

F8 Sets the date of your computer's real time clock.

MM-DD-YYYY specifies the month, day, and year to set as the date.

F9 Sets the time of your computer's real time clock.

HH:MM:SS specifies the time in hours, minutes, and seconds.

Verify all the settings. If everything is correct, press ENTER and then ESC to exit the Setup mode.

Video Monitor Problems

If you make all the proper monitor connections and still have trouble with your video, check for the following:

- Is the monitor power cord properly connected to an AC outlet?
- Is the monitor power on?
- Is the brightness control knob on the display turned up?
- Is the signal cable from the display properly plugged into the connector at the rear of the system?
- Is the display device properly set up?

Printer Problems

If you make all the proper printer connections and still have trouble, check for the following:

- Is the printer power cord properly connected to an AC outlet?
- Is the printer power switch on?
- Is the signal cable from the printer properly plugged into the connector at the rear of the system?
- Is the printer ready or is it off line, out of paper, out of ribbon, and so on?
- Is the printer set up for your system? Refer to "Using a Printer with Your Programs" in *Introduction to MS-DOS*.

External Keyboard Problems

If you make all the proper external keyboard connections and still have trouble, check for the following:

- Is the signal cable from the external keyboard properly plugged into the connector at the rear of the system?
- Is the input device properly set up?
- Is the keyboard set to IBM XT-compatible mode?

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Introduction

MS-DOS is a *disk operating system*. An operating system is a group of programs that act as an interpreter and manager for your computer, monitor, and peripherals. Disk operating system means that the operating system can also direct and interpret information to and from disk drives. A computer can do only what you instruct it to do. The MS-DOS operating system conveys your instructions to the computer.

How much you need to know about your MS-DOS operating system depends on how you plan to use your computer. If you use your computer only for running application programs (software written to perform specific tasks or solve specific problems), you need to know little about the operating system. On the other hand, if you plan to use advanced operating system features or create your own programs, you need to become quite familiar with the operating system. Further, there are many MS-DOS command features included specifically for use with the options available on your computer. If your computer system includes options, you should familiarize yourself with any features of MS-DOS that are specific to those options.

Regardless of how you intend to use your computer, there are some basic procedures you must know. These include:

- Entering MS-DOS instructions
- Starting an application program
- Preparing a diskette to store information
- Copying operating system, program, and data files to a diskette
- Duplicating a diskette

This manual presents this information and a few other items you might find helpful. If you want more information, refer to the *MS-DOS/GW-BASIC Reference Manual* (Cat. No. 25-1508), which discusses the MS-DOS operating system and GW-BASIC in detail.

Entering MS-DOS Instructions

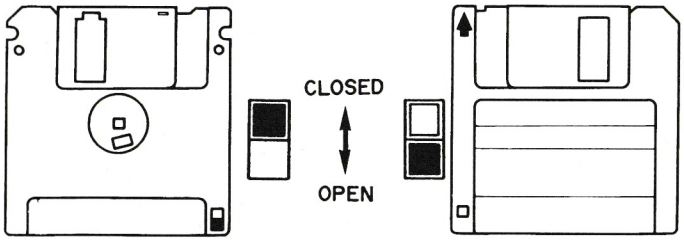
The MS-DOS instructions you give to the computer are called *commands*. You type commands at a *system prompt* (A > or C >), which indicates that MS-DOS is at the *command level* (ready to accept commands).

The disk drive that MS-DOS is set up to access when you enter commands is called the current drive. You can access information on a drive other than the current drive by including a drive reference when you enter a command. MS-DOS regards the primary drive from which you started the system (normally the left drive on Tandy 1400 FD, the hard disk on Tandy 1400 HD) as the current drive unless you specify otherwise. Refer to "Changing the Current Drive" in "Floppy Disk Drives and Diskettes" to change the current drive.

Because your computer carries out MS-DOS commands exactly as you give them, your entries must be precise and have perfect syntax (spelling and form). You can type your instructions to MS-DOS in either uppercase or lowercase letters. However, pay special attention when typing characters that are interchangeable on a typewriter keyboard. These characters are not interchangeable on the computer keyboard. For example, never type the letter **O** for **0** (zero) or the lowercase letter **l** for **1** (one). Be sure you type commands exactly as they are shown.

Floppy diskettes require careful handling. Be sure to read "Care and Handling of Floppy Diskettes" in *Introduction to the 1400 FD/1400 HD.*

Write-Protection



Diskettes have a hole in one corner. This is a write-protect hole. Slide the cover down (viewed as above) to open the hole and write-protect the diskette. The system cannot write (store) data on a write-protected diskette. Leave the hole closed to write-enable the diskette for storage. This feature protects diskettes from inadvertent destruction of data.

Copying Diskettes

The magnetically stored information on diskettes can be destroyed by exposure to magnetic fields or by improper use or handling. You should make several copies of important diskettes. Should anything happen to a copy, immediately make another.

> **Note:** You should now make backups of your MS-DOS/ BASIC diskette.

There are two ways to copy important diskettes. You can use the DISKCOPY command, or you can use the FORMAT and COPY commands.

The DISKCOPY command creates an exact duplicate of a diskette. DISKCOPY duplicates all information, all files, and the entire directory structure of a diskette onto a new diskette. Use DISKCOPY whenever you want to exactly duplicate an operating system or other diskette.

The FORMAT command organizes a blank diskette so that you can copy to it. Many application programs require that you format data diskettes to store the information they produce. You must format a diskette before you can copy to it with the COPY command.

The COPY command duplicates the files in the current or specified directory and stores them on a formatted diskette. (Format with the /s *switch*, explained later in this chapter, if you are copying an operating system diskette.) The copy is performed on a file-by-file basis. You can use COPY to back up an entire diskette or to duplicate selected files only.

The COPY command does not copy system files, hidden files, or files outside the current or specified directory.

The procedures presented in this chapter use two terms you need to understand. They are *target diskette* and *source diskette*. A target diskette is the diskette you select to receive a copy of another diskette. The source diskette is the diskette that contains the programs, system files, and/or data files that you want to copy.

> **Note:** Some application programs you buy are copy-protected. You cannot make copies of these program diskettes. Check the program manual for information on protecting the data on copy-protected diskettes.

Using DISKCOPY with One Disk Drive (Tandy 1400 HD)

1. If your computer is off, turn it on, and start MS-DOS as outlined in "Getting Started with Your Computer" in *Introduction to the 1400 FD/1400 HD.*

2. *At the system prompt (either C >* or A *>)*, type:

   ```
   diskcopy a: a: [ENTER]
   ```

3. The screen displays the following prompt:

   ```
   Insert SOURCE diskette in drive A:
   Press any key when ready
   ```

   Make sure the diskette you wish to copy is properly inserted into Drive A. Then, press [ENTER]. The screen displays:

   ```
   Copying 80 tracks
   9 Sectors/Track, 2 Side(s)
   ```

   This message can differ according to the diskette you are copying. After a few moments, the screen displays:

   ```
   Insert TARGET diskette in drive A
   Press any key when ready
   ```

4. Remove the source diskette. Be sure the target diskette is not write-protected (hole should be covered). Insert the target diskette into Drive A, and press [ENTER].

   DISKCOPY formats the target diskette (if not already formatted) and copies the information from the source diskette to the target diskette. In some instances, MS-DOS might request that you swap the source and target diskettes one or more times before copying is complete. When the DISKCOPY procedure is complete, this message appears:

   ```
   Copy another diskette (Y/N)?
   ```

5. To create more copies, press [Y], press [ENTER], and again follow the prompts. To ensure the safety of your operating system, make at least two copies of MS-DOS.

   After you finish making copies, press [N] at the `Copy another diskette?` prompt. The DISKCOPY procedure ends, and the system prompt reappears.

6. Set aside one of the copies for daily use as your working diskette. Store the original diskette and all additional copies away from heat, magnetic sources, electric motors, and in a relatively dust-free environment.

Using DISKCOPY with Two Disk Drives (Tandy 1400FD)

1. If your computer is off, turn it on, and start MS-DOS as outlined in "Getting Started with Your Computer" in *Introduction to the 1400FD/1400HD.*

2. At the system prompt (A>), type:
   `diskcopy a: b:` ENTER

3. The screen displays the following prompt:

   ```
   Insert SOURCE diskette in drive A:
   Insert TARGET diskette in drive B:
   Press any key when ready...
   ```

   To copy the system diskette, leave it in Drive A. Otherwise, insert the diskette you wish to copy into Drive A.

   Be sure the target diskette is not write-protected (hole should be covered). Insert the target diskette into Drive B, and press ENTER.

4. The screen shows:

   ```
   Copying 80 tracks
   9 Sectors/Track, 2 side(s)
   ```

   This message can differ according to the diskette you are copying.

   DISKCOPY formats the target diskette (if not already formatted) and copies the information from the source diskette to the target diskette. When the DISKCOPY procedure is complete, this message appears:

   ```
   Copy another diskette (Y/N)?
   ```

5. To create more copies, press Y, press ENTER, and again follow the prompts. To ensure the safety of your operating system, make at least two copies of MS-DOS.
   After you finish making copies, press N at the `Copy another diskette?` prompt. The DISKCOPY procedure ends, and the system prompt reappears.

6. Set aside one of the copies for daily use as your working diskette. Store the original diskette and all additional copies away from heat, magnetic sources, electric motors, and in a relatively dust-free environment.

Formatting a Diskette with One Disk Drive (Tandy 1400 HD)

1. If your computer is off, turn it on, and start MS-DOS as in "Getting Started with Your Computer" in *Introduction to the 1400FD/1400HD.*

2. At the system prompt (C> or A>), type:

   `format a:` ENTER

   (To format a diskette so that it can be used for start up, type **format a:/s** ENTER. The **/s** *switch* tells MS-DOS to copy the hidden system files to the diskette after it is formatted.)

3. FORMAT asks you to insert the new (target) diskette. If the system diskette is in Drive A, replace it with the diskette you want to format, and press ENTER.

4. When FORMAT is complete, a prompt appears giving you the option to format another diskette. To do so, press Y, and repeat Step 3. Otherwise, press N.

5. Remove the formatted diskette from the disk drive, and replace it with the MS-DOS diskette if necessary.

6. Store formatted diskettes in a safe place until you are ready to use them.

Formatting a Diskette with Two Disk Drives (Tandy 1400 FD)

1. If your computer is off, turn it on, and start MS-DOS as outlined in "Getting Started with Your Computer" in *Introduction to the 1400 FD/1400 HD.*

2. At the system prompt (A>), type:

   `format b:` ENTER

   (To format a diskette so that it can be used for startup, type **format B:/s** ENTER. The **/s** *switch* tells MS-DOS to copy the hidden system files to the diskette after it is formatted.)

3. FORMAT asks you to insert the new (target) diskette. Insert the blank diskette you want to format into Drive B, and press ENTER.

4. When FORMAT is complete, a prompt appears giving you the option to format another diskette. To do so, press [Y], and repeat Step 3. Otherwise, press [N].

5. Store formatted diskettes in a safe place until you are ready to use them.

Copying an Entire Diskette

Note: You must format a diskette before you can use the COPY command to copy information to it. (Be sure to format with the **/s** switch if you are duplicating an operating system or other startup diskette.)

1. If your computer is off, turn it on, and start MS-DOS as outlined in "Getting Started with your computer" in *Introduction to the 1400 FD/1400 HD.*

2. Remove the system diskette from Drive A, and replace it with the source diskette (the diskette you are copying).

3. Insert the target diskette (the diskette to which you are copying) into Drive B.

4. At the system prompt (A >), type:

   ```
   copy a:*.* b: [ENTER]
   ```

   The operating system immediately begins the copy procedure. The COPY command duplicates the Drive A files and copies them to the Drive B diskette.

   Note that the example prompt copies from Drive A to Drive B. However, the same command also works with one drive. When using one drive, you are alternately prompted to insert a diskette in Drive B, then Drive A, then Drive B again, and so on until the copy procedure is complete.

   To keep diskette swapping straight, think of the source diskette (the diskette you are copying from) as Diskette A. Think of the target diskette (the diskette you are copying to) as Diskette B. When instructed to insert a diskette into Drive A, insert Diskette A into your drive. When instructed to insert a diskette in Drive B, insert Diskette B into your drive.

   See "More on MS-DOS Commands and Keys" for more information on the COPY command.

Changing the Current Drive

The current drive is the one that MS-DOS and your application programs normally read from and write to. You can access information on a drive other than the current one by including a drive reference when you enter an MS-DOS command. MS-DOS regards the drive from which you started the system up as the current drive unless you specify otherwise. To change the current drive to other drive, type the drive name followed by colon, then press ENTER. For example, to change the current drive to Drive B on the Tandy 1400FD, type:

```
b: ENTER
```

The system prompt changes from A> to B>. Drive B is now the current drive.

To access a diskette in a drive other than the current one, you must include the drive name. For example, assume Drive B is the current drive. To execute a program named Myprog in Drive A, type the following at the B> prompt:

```
a:myprog ENTER
```

Note: Changing the current drive is not the same as changing the drive select switch setting. When you change the current drive, you tell the computer which drive to access whenever you do not specify a drive in a command. When you change the setting of the drive select switch, you reverse the names (reference) of the drives. Refer to "The Floppy Disk Drives" or "The Hard Disk Drive" in *The System Unit*. Remember that you must change the drive select switch setting to start up from the optional external floppy disk drive.

Using Application Programs with MS-DOS

Application programs are designed to perform specific tasks such as word processing, spreadsheet analysis, graphics, and so on. Many application programs require you to use the MS-DOS diskette to start up your computer. For these applications, you can start up with an operating system diskette and then switch to the application diskette. A few applications let you start up directly from the application diskette. Check your application program's documentation for the specific steps necessary to start your application.

When you are using an application program, the program's prompt and screens appear instead of the operating system prompt. Application programs use the operating system to help process information, and MS-DOS manages the computer's operations.

Using a Printer with Your Programs

If your application programs require the use of a printer, you must be sure the computer is set up to work with the printer you choose. Many printers automatically add a line feed after each carriage return. If your application program also adds a line feed after a carriage return, your text prints doublespaced.

First, determine whether you have an extra line feed by using your application programs to run a printout test. If the text prints doublespaced, then turn off one of the line feeds by setting the appropriate printer switches.

Setting the Printer Switches

Many printers (including most Radio Shack dot matrix, DMP-series printers) have a hardware DIP switch that determines whether or not the printer adds a line feed after a carriage return. If your printer has a carriage return DIP switch, set it to CR=CR to turn off the line feed. Refer to the documentation that came with your printer for specific information on DIP switch settings.

How MS-DOS Stores Information

If you want to learn more about how your operating system works, you need to know how MS-DOS organizes and stores data.

About Files

All information on the diskette is stored in files. A file is simply a collection of information. These are the main types of files:

- **System files** contain operating system information that manages the computer's operations.
- **Program files** contain information that causes the computer to perform a task or set of tasks.
- **Data files** contain information you enter, such as the documents and spreadsheets you create with application software.

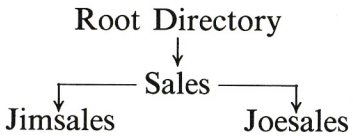
About Directories

All files on a diskette reside in a directory. A directory is simply a storage space for the names of your files. When you format a diskette, you create one directory called the *root* directory. On your MS-DOS/BASIC diskette, the commands are contained in the root directory. When you start your computer using MS-DOS, you are automatically in (operating from) the root directory.

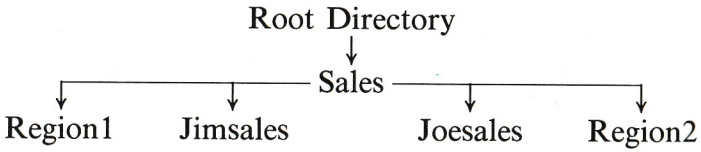
If you create another directlory, it is a *subdirectory* of the root directory. For instance, if you created a directory named Sales, it would reside in the root directory, and your disk organization would look like this:

Root directory
↓
Sales

You can now store files in the Sales directory. If you create two files named Joesales and Jimsales, the organization look like this:



You can create other directories within the Sales directory. If you create two subdirectories in Sales named Region1 and Region2, the organization would look like this:



You can continue to create files and directories on a disk until its storage space is filled.

Multiple Directories

There is nothing wrong with storing all your diskette files in the root directory. Doing so makes it easy to access them because you are always in the same directory as your files. However, organizing a disk into multiple directories makes it easy to keep your data organized when you have many files or if more than one person is using the same disk. Such a multiple-directory organization is especially helpful when using hard disks because hard disks can store hundreds (or even thousands) of individual files.

About Filenames

Following is a complete list of acceptable characters for filenames:

- Uppercase letters A through Z
- Lowercase letters a through z
- Decimal digits 0-9
- Symbols $ & # % ' ( ) - @ ^ { } ! _

When creating filenames, do not use more than eight characters. MS-DOS ignores any characters after the eighth. For example, MS-DOS regards both Accounts1 and Accounts2 as Accounts. If you save both files, MS-DOS writes over the first file with the second, destroying the first file.

Other than the ones listed above, symbols are not allowed in filenames. There are also a few special words (MS-DOS device names) that you cannot use. These are:

aux	com1	com2
con	lpt1	lpt2
lpt3	nul	prn

Filename Extensions

Any filename can contain an extension, which further identifies the file. An extension appears at the end of a filename, preceded by a period.

Extensions can be a maximum of three characters and can include the same characters allowed in filenames. If you attempt to give extensions more than three characters, MS-DOS uses only the first three.

If you include an extension in a filename, you must use that extension whenever you specify the file.

Examples of Filenames

Examples of valid filenames are:

mydata1	SAMPLE
1.tst	$100GIFT
records.srt	'HELP'.fil
XXX.xx	File#1.txt
10%SALES	par@64.gam
PROG1.BAS	–Check.bal
PROG2.bas	myprog.sor

Examples of invalid filenames are:

his*hers	An asterisk is not a valid character.
.DATA	A period is valid in a filename only when separating the filename from its extension.
regionsales	MS-DOS uses only the first eight characters of the filename (regionsa).
COST+INT	A plus symbol is not a valid character.
CON.dat	CON is a word reserved by MS-DOS.

Using a Hard Disk

Hard disks can greatly expand the capacity of your computer system. MS-DOS can access data and programs from a hard disk more quickly than from a diskette. Hard disks also have much greater storage capacity than diskettes.

Hard Disk Commands

After you copy MS-DOS onto a hard disk, you seldom need to use your diskette drive(s) except for copying files and making backups of hard disk files. If you purchase an application program, you can copy it to hard disk, also.

All the commands that operate on diskette systems also operate on systems with both diskette and hard disk drives. There are also several commands designed for use with hard disk systems.

If you have a hard disk initialized as the active drive, MS-DOS assumes it is Drive C.

Copying To Your Hard Disk

You can transfer programs or any files from diskettes to hard disk using the COPY command. For instance, if you have a program named Worldgeo that you want to place on your hard disk, you would place the diskette in Drive A and type:

```
copy a:worldgeo c: ENTER
```

If you want to copy all the programs and files from a diskette to hard disk, use this command:

```
copy a:*.* c: ENTER
```

To execute the programs, be sure you are operating from your hard disk. Type the proper filename, and press ENTER. For instance, to execute Worldgeo, you would type:

```
worldgeo ENTER
```

Note: Many application programs require specific procedures to install them on hard disk and to execute them. Refer to your program manuals for detailed information.

Backing Up Your Hard Disk

Making backups of hard disk files is even more important than making diskette backup files. Because the storage capacity of a hard disk is so much greater, lost data can represent thousands of hours of lost work.

You can use the BACKUP command to make copies of one or more directories or of an entire hard disk. For example, if you have a subdirectory named Mystuff in the root directory of your Drive C hard disk, you can use BACKUP to copy it to a diskette. With a formatted diskette in Drive A, type:

```
backup c:mystuff a:/s ENTER
```

Note: Unless you specify otherwise, using this method causes MS-DOS to erase any files currently on the diskette used for the backup. Be sure you are using a newly formatted diskette or a diskette that contains files you do not want to keep.

To accomplish the same backup without erasing files currently on the diskette, add the /a switch to the command. In this case, /a causes the BACKUP command to append the new backup files to any existing files on the diskette. In MS-DOS, a switch is always preceded by a slash (/) symbol. The same command, with the /a switch, is:

```
backup c:mystuff a:/s/a ENTER
```

The /s switch, used in the previous command, tells MS-DOS to back up all the files in a directory and all the directories and files that branch from that specified directory. You can use the BACKUP command with the /s switch to back up the entire hard disk to diskettes. Before using this command, use FORMAT to prepare several diskettes for use during the backup procedure. To back up everything on Drive C, type:

```
backup c:\ a:/s ENTER
```

The backward slash (\) is an abbreviation for the root directory of any disk. Therefore, this command line tells MS-DOS to copy all files from the root directory of Drive C to the diskette in Drive A. The /s switch tells MS-DOS to copy all directories, and their files, that branch from that designated directory. Because all directories branch from the root directory, BACKUP copies all the files in all the disk directories. For more information on BACKUP and its switches, see BACKUP in the *MS-DOS Reference Manual.*

Restoring Backups to Your Hard Disk

Use the RESTORE command to copy one or more directories from diskette to hard disk. Use RESTORE only on those directories that were copied to diskette using BACKUP.

To restore the directory Mystuff from the diskette in Drive A back to the hard disk (Drive C), type:

```
restore a:\mystuff c:/s ENTER
```

To restore all the files that were backed up from all directories on Drive C, insert the first backup diskette into Drive A and type:

```
restore a: c:/s ENTER
```

The /s switch tells MS-DOS to copy all files and directories that were saved to diskettes using the BACKUP command. If the backup required more than one diskette, you are prompted when to swap diskettes during the restore process.

For more information on RESTORE and its options, see the *MS-DOS Reference Manual.*

More on MS-DOS Commands and Keys

The MS-DOS operating system includes both internal and external commands. MS-DOS stores its internal commands in memory when you load the operating system. Internal commands remain in memory until you reset or turn off the system. These commands execute immediately when you enter them. COPY and DIR are examples of internal MS-DOS commands. MS-DOS stores its external commands on diskette as program files.

When you enter an external command, MS-DOS searches for the command on the diskette and drive you specify and then executes it. CHKDSK, DISKCOPY, and FORMAT are examples of external MS-DOS commands.

Typing Commands

- You can enter a command whenever the screen displays the system prompt. However, the disk in the current drive (as depicted by the system prompt) must contain the command you want to execute, or you must specify the drive where MS-DOS can find the command.
- A command consists of one word, the command name. A command line consists of one or more command names and their associated *parameters* and *switches*. Parameters and switches are special information you include within a command. They provide data needed by a command, or they determine how the command operates.
- A command line can have a maximum of 127 characters, including any combination of uppercase or lowercase letters. To execute a command line, press ENTER. For example, to clear the screen, type:

  `cls` ENTER

Editing Commands

MS-DOS tries to carry out the commands you type. If you make a typing mistake that results in an invalid command, MS-DOS tells you so with an error message. If you make a typing mistake, but the resulting command is a valid one, MS-DOS carries out the command as you entered it.

If you notice a typing mistake before you press [ENTER], you have two choices:

- Backspace to the mistake, and retype to the end of the line.
- Press [ESC] to exit the line you are typing, and start over.

If you use [ESC] to end a line, the system prompt does not reappear. Type the command line, and press [ENTER] to execute it.

Special Keys

The following keys and key sequences have special significance to MS-DOS.

space bar	Moves the cursor (the blinking underline character displayed on the screen) one space to the right, and adds a space to a line.
[CTRL]	Lets you give complex commands to your computer by pressing two or three keys simultaneously. Hold down [CTRL], and press the other keys.
[BACKSPACE] or [←]	Moves the cursor left one character and erases the character in that position.
[CTRL] [C] or [CTRL] [BREAK]	Stops the execution of an MS-DOS command or of a program that uses MS-DOS functions. If the program does not access MS-DOS, the program does not recognize this key sequence. (The computer might take a few moments before it recognizes the key sequence.)

CTRL P	Sends each character of output to the printer. Press the sequence again to stop the echo.
ESC	Terminates the current line without processing it, and clears the line buffer. Displays a backslash (\), and performs a carriage return. (The cursor moves down one line and returns to the left margin.) Although the system prompt does not appear, the system is ready for a command.
ENTER	Executes a command or a carriage return. Begins processing the command line you type. ENTER also causes a carriage return. (The cursor moves down one line and returns to the left margin.)
CTRL J	Ends the current line, and moves the cursor to the next line without processing the line. Press ENTER to execute the command line when it is complete.
Fn ~	Sends everything currently displayed on the screen to the printer.
CTRL ALT DEL	Resets your computer the same as if you had turned it off and then on again.
CTRL S	Stops scrolling information on the screen to let you view it. Press any key to resume scrolling.
CTRL ALT INS	Setup mode. Displays the setup menu.

Several keys and key sequences are available to help you edit an MS-DOS command line. These keys act on the command line in the *template*. (The template is an area that contains the last MS-DOS command you entered and executed.) Press [F3] to display the template. You can execute the command line again by pressing [ENTER], or you can use the following keys to edit the command line in the template.

[ENTER]	Enter line. Makes the new line the new template, and executes the command line.
[ESC]	Void line. Voids the new line but does not affect the template.
[INS]	Insert character. Goes into the insert mode to enable you to insert characters into the template. Press [F3] to end the insert mode.
[DEL]	Delete character. Erases the next character from the template. The character is skipped and is not copied to the command line.
[→] or [F1]	Copy character. Copies the next character from the template, and displays it on the command line.
[F2] *char*	Copy to *character*. Copies all characters in the template up to the specified character, and displays them on the command line.
[F3]	Template. Redisplays the entire template.
[F4] *char*	Delete to *character*. Deletes all characters up to the specified character from the template. They are skipped and are not copied to the command line.
[F5]	Replace template. Makes the line you type the new template but does not execute the command.
[F6] or [CTRL] [Z]	End-of-file. Puts an end-of-file marker in the template.

Special Commands

You have learned about a number of MS-DOS commands that help you set up and use your computer. There are many more commands available. This section contains information about a few of the most helpful commands. Learning these commands makes it easy for you to look up other commands and functions in the *MS-DOS Reference Manual.*

Viewing a Directory

To look at the directory (a list of files) of a diskette, use the DIR command. For example, to view the contents of the diskette in the current drive, type:

```
dir [ENTER]
```

If a diskette contains more filenames than can appear on the screen at one time, all but the last 22 scroll off the top of the screen. MS-DOS has three ways to help you overcome this problem:

- Press [CTRL] [S] to stop the screen from scrolling. (Press any key to restart the scrolling.)
- Use the /P switch with the DIR command. A switch tells MS-DOS to execute a command in a certain manner. In this case, /P pauses the directory listing when the screen is full. Press the space bar to resume the listing. To use the /P switch, type:

  ```
  dir /p [ENTER]
  ```

- Use the /W switch to display the files in five columns. This format usually allows all filenames to appear on the screen at once. The format for this command line is:

  ```
  dir /w [ENTER]
  ```

Copying Files

It is easy to copy a file from one diskette to another using the COPY command. The COPY command can copy files between different drive types. This command requires the following information:

- The disk drive in which the file you want to copy resides
- The name of the file you want to copy
- The disk drive in which you want the new copy to reside
- The name you want to give the copy. (You can omit the name if you want to assign the same filename as the original.)

For instance, to copy the joe-sls file from Drive A to the Drive B diskette, type:

```
copy a: joe-sls b: ENTER
```

The copy command has other uses as well. For instance, you can use COPY to append files and to combine files. See the COPY command in the optional *MS-DOS/GW-BASIC Reference Manual* for more information on this versatile command.

Renaming Files

MS-DOS also lets you change the names of files. Suppose you have a staff change in your company. Use RENAME to give your old file a new name. For example, to change Joe-sls to Sam-sls, type:

```
rename joe-sls sam-sls
```

Looking Inside Files

TYPE is a command that lets you examine files that consist of text characters. For instance, to view the joe-sls file, type:

```
type joe-sls ENTER
```

The file contents appear on the screen. If there are too many lines in the file to fit on the screen, use CTRL S to stop the screen from scrolling. Press any key to restart the scrolling.

If you use TYPE to display a file that is not a text file, it displays meaningless data.

Using Other Commands

MS-DOS has more than 50 commands and functions. The guidelines you learned in this manual provide the background you need to make use of MS-DOS's capabilities.

By referring to the *MS-DOS/GW-BASIC Reference Manual*, you can learn how to create and edit data files, create command files to accomplish numerous tasks in sequence, create directories, send information to your printer, and much more.

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